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# Improper waste disposal in Ota, Ogun State- a proposed waste segregation approach

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**Abstract.** The increasing and improper waste disposal attitude of many residents in Ota, Ogun State has continued to be a source of threat to human health and a healthy environment in this region. It has fostered an increase in environmental pollution over the years due to lack of proper and sustainable waste collection and management system. Previous studies have shown that the larger population of Ota residents have the attitude of burning wastes, dumping wastes on road sides, disposing wastes in canals and drainages during rainfall. These bad approaches are injurious to man's health and have the potential to create further problems such as roads and drainages blockages. To this end, it becomes imperative and very urgent for the government of Ogun State to seriously intervene by making necessary facilities and enforced policies available so as to curb these wastes management issues. This paper discusses the issues of waste disposal in Ota, Ogun State and suggests a systematic approach to collect, segregate, recycle and dispose wastes. This will also be very effective with the swift intervention of the government-backed up policies.

**Keyword.** Waste, Wastes Disposal, Dumping Site, Recycling, Segregation

## 1. Introduction

Municipal solid waste is one of the major contributor to the challenges that underdeveloped countries face [1]. The generation of waste by mankind is inevitable, and its management is tasking due to the rapid industrialization and urbanization [2]. The need for man to survive has made necessary the need for man to carry out several activities such as growing of crops for consumption and other essential purposes, processing of food from one form to another, building of houses for shelter and many more [1]. Moreover, most of these activities carried out by man lead to waste generations of different kinds. Some of these wastes are biodegradable while some are not, depending on the composition of the residues. Since most of man's activities lead to waste generation in the society, an increase in population in any region increases the rate of waste generation in that region. Thus, the rise in population, industrialization, economic growth, and urbanization, as well as the indiscriminate refuse dumping in urban areas are major factors that contribute to waste pollution in the society. Hence, improper disposal of these wastes portend negative impacts on human health and the environment. Taking Ota as a case study, the human population in Ota as at 2006 population was 163,783 [3], and this population has increased owing to the developments that have taken place between then and now. Some of these developments are the establishment of institutions such as Covenant University, Bells University, and Gateway Polytechnic. May and Baker was also established among other industries in Ota. Many commercial malls and food production industries have also been built in Ota. These new developments have sporadically increased the population of Ota. According to the report of [2, 4], the population increase in Ota over the years has increased the quantity of waste generated without appropriate measures to manage these wastes [5]. Lack of proper waste collection systems at strategic



locations in Ota over the years have also resulted in residue of different categories being dumped together on roadsides, in drainages and on lawns, as shown in the figure 1.

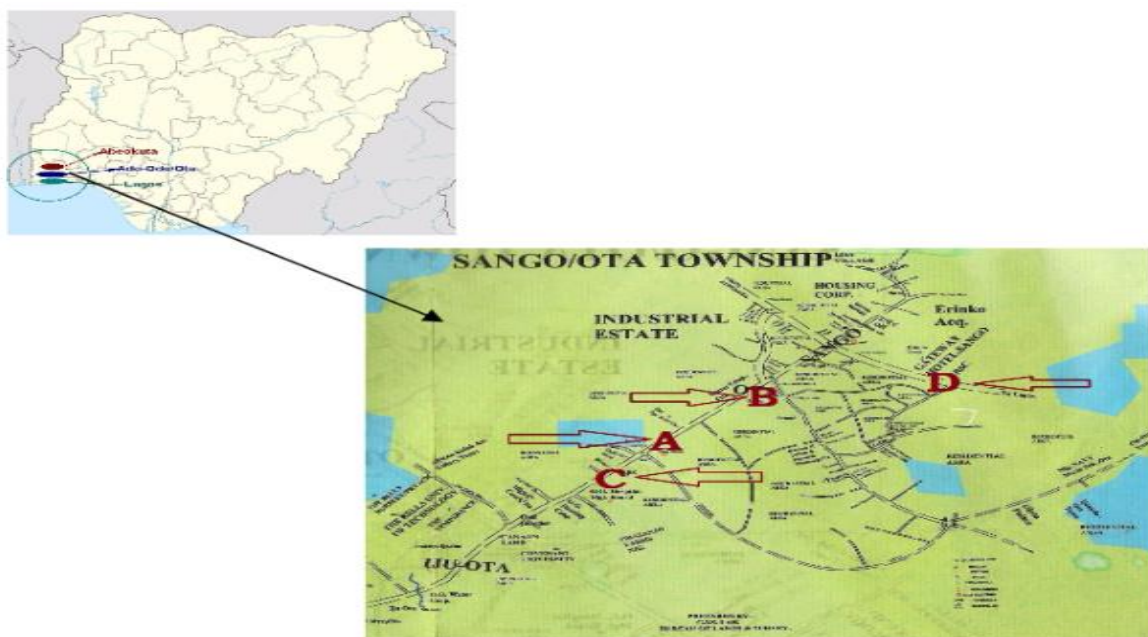


**Figure 1.** Waste-dump site along Idi-Iroko, road, Ota, Ogun State

These wastes comprise of different types components such as papers, plastics, metal, food, polyethene, plants, and woods. Thus, a tedious task arises when sorting the wastes into different categories. The improper waste disposal and lack of wastes management measure in Ota have led to several types of environmental pollution. Despite being a densely populated region of Ado-Odo Local Government Area, the community has no functional waste collection system. Consequently, environmental pollution increases daily, and this auspicates negative impact on human health and the society. Due to this gap, the daily wastes generated in Ota is not known. Therefore, this paper aims to present a possible solution to the waste generation and collection problems existing along Idi Iroko road, Ota, Ogun State.

### 1.1. Study Area

Ota is located in Ado-Odo local government of Ogun State, Nigeria [6]. Ado-Odo Ota is one of the 20 local governments located in Ogun State, Nigeria. Ota is the headquarters of its local government with the second-largest population in the state. Its coordinate lies between Longitudes  $2^{\circ}53$  E and  $3^{\circ}14$  E and Latitude  $6^{\circ}39$  N and  $6^{\circ}30$  N [7]. The map of the local government which hosts Ota is presented in Figure 2.



**Figure 2.** Ado-Odo Ota Local Government [2].*1.2. Sources and types of solid waste generated in Ota town*

Ota can be described as a typical urban area involving in a number of industrialized and commercial activities. Thus, the type and amount of waste produced in these regions is proportional to the level of economic activity, resource consumption, and economic growth as well as the individual's standard of living [8, 9 and 10].

While it is located within one of Local government areas with small land masses in the states, it was identified with numerous trading activities and fewer agricultural activities [11]. In the process of their major activities; commercial, industrial, academic and agricultural, biodegradable and non-biodegradable solid waste materials such as papers, food remains, leaves, polyethylene bags, plastics, metals etc., are being generated. Biodegradable solid wastes are those made up of degradable materials such as agricultural waste, food remnants, wood, paper and fruits, while the non-biodegradable solid wastes constitute non degradable materials such as bottles, plastics, cans, tins and tetra packs among others [12].

Usually, unwanted materials generated from the activities of an urban or semi urban area are referred to as urban or municipal solid wastes. They include domestic garbage and trash, solid wastes from public places such as industries, hospitals, wastes from markets, yards, streets, and other litters [8, 13]. These materials, when not handled properly may cause problems to human, animals and the environment. The sources solid wastes could be from the following broad areas [14];

- i. Homes (e.g. food remnants)
- ii. Structural fields (Construction sites; roads, houses etc.)
- iii. Healthcare centres (i.e. wastes from hospitals, clinics and medical laboratories)
- iv. Industrial and commercial areas such as markets, malls and hotels
- v. Educational centres (primary, secondary, tertiary and other tutorial centres)

*1.3. Processes of solid waste management*

The term waste management connotes process of waste collection, transport, storage, waste treatment, disposal and the subsequent maintenance of waste at the disposal site [14]. Thus, waste management is incomplete without maintenance at the disposal site. Furthermore, the process of waste management includes the right combination of planning, financial, administrative and legal functions, and the handling of solid waste. This means that to establish an efficient waste management strategy, all components of wastes management must be considered. In addition, an adequate knowledge of how solid wastes are generated and proper segregation method would guarantee an applicable waste management system [14]. In Ota, [14] highlighted that the region is classified as having poor funding, insufficient collection facilities, man power and absence of well-designed disposal sites. Hence the people practice burning, open dumping, while others bury theirs as a way to disposing of their wastes.

*1.4. Derivatives of proper solid waste management and recycling*

As earlier highlighted, an adequate waste management system and implementation help to improve and maintain the aesthetics of the environment. In addition, it procures a sustainable environment by preventing pollution of land, air and water. Waste recycling on the other hand helps to reduce amount of solid waste to be moved to the usual dump site and this in turn helps to reduce cost [2]. Also, recycling of waste brings economic advantage to the community when these waste materials are reused as raw materials and the environment is kept clean [15]. Moreover, in terms of ecosystem protection, it was stated in ENVIS [16] that waste recycling could guarantee reduction in CO<sub>2</sub> emission of about 3.6 metric tons. Other studies have also highlighted the advantages of proper waste handling and recycling to include; using plastic waste to produce interlocking blocks [14], plastic waste recycling generates employment and helps to reduce cost of plastic manufacturing in addition to reducing the stress of searching for external source of raw material such as virgin resin etc., [17]. Consequently, the economy of the nation is also improved when the price of plastic material is reduced when cost of production fall [18]. Lastly, solid waste recycling enhances preservation of

monies that would be spent in mitigating drainage problems, handling and treating landfills and cleaning of water bodies [19].

### *1.5. Waste management strategies from literatures*

Some researchers have identified several ways that can enhance proper waste management. According to [20], some of these approaches are strategies such as engineering, environmental, scientific, economic and behavioural approaches that are vital in designing a waste management system in which every particular approach specifies techniques that would affect and guide certain patterns and theoretical ideas. [11] Also studied the behavioural approach which involves evaluating the effect of human behaviours and opinions on the management of waste. The study also investigated the view of the public coupled with the attitudinal approach of the communities towards waste management in the five Local Government Areas examined. This report also established some basic factors which impacted on the waste management perspective of the regions. The factors includes the level of education, age and income level. The study also revealed that 36.6% and 54.4% of the habitants still throw material wastes into open dumps while maintaining the idea that the cost of implementing waste management process is high and should therefore be the responsibility of the government. [21] Examined the approach of urban residents towards solid waste disposal and management in Calabar, Nigeria and recalled that some significant elements needs to be in place to effect a paradigm shift in the attitude and techniques of effective solid waste management in the study area and the country at large. Thus, in instituting a sustainable standard for municipal solid waste management in urban/semi urban regions in Nigeria, there is a need to design a clear, simple, systematic and affordable approach for waste collection.

### *1.6. Waste Problem in Nigeria*

The problem of systematic collection, segregation and disposal are the main issues with solid waste management in Nigerian communities [11, 22]. Researchers have highlighted the enduring situation where close to 80-90% of generated wastes in least developed communities in Nigeria are uncollected without consideration for safety despite the heavy investment that has been channelled to solid waste management [23, 24 & 25]. This situation of solid waste management in Nigeria have therefore become a burden to environmental protection agencies where collection, transport and final disposal is side-lined to be the sole responsibility of the municipal and other government authorities [11, 25]. While the population of Nigeria is growing rapidly, it is has become a major contributor to global solid waste quantity [26]. Solid unwanted materials released from domestic and public sites such as shops, markets, industries, mines and agricultural activities which could constitute environmental challenge are referred to as solid wastes [13]. It includes all biodegradable or non-biodegradable materials in form of agricultural waste, food remnants, wood, paper and fruits, bottles, plastics, cans, tins and tetra packs among others [11, 12, 27, 28 & 29]. Researches reveal that 52% Nigerians are urban dwellers, resulting to 2.53% average population growth rate annually as at the year 2020, thereby leading to 32million tons of annual solid waste accumulation and less than 40% are managed properly [26,30].

This large waste generated does not match the strategies set by authorities and in many cases. Citizens indulge in careless solid waste disposal into the environment [26, 31]. The government have also in the past established National Integrated Municipal Waste Management Intervention Programme in seven states including the Ogun state where Ota is located [22]. Despite this, the problems of solid waste handling in Nigeria still persist due to poor policy implementation as a results of lack of public enlightenment programs, absence of enforcement actions and economic considerations that have made it difficult to organize human and environmental resources for alleviating the uncountable waste management constraints [2, 29, 32 & 33]. Apparently, municipal solid waste management in Nigeria remains a substantial matter requiring urgent attention.

### *1.7. Waste problem in Ota*

Ota community has no functional waste collection system in place. This gap has led to improper waste disposal attitude among many residents, as shown in Plate 1. Environmental pollution and the affected



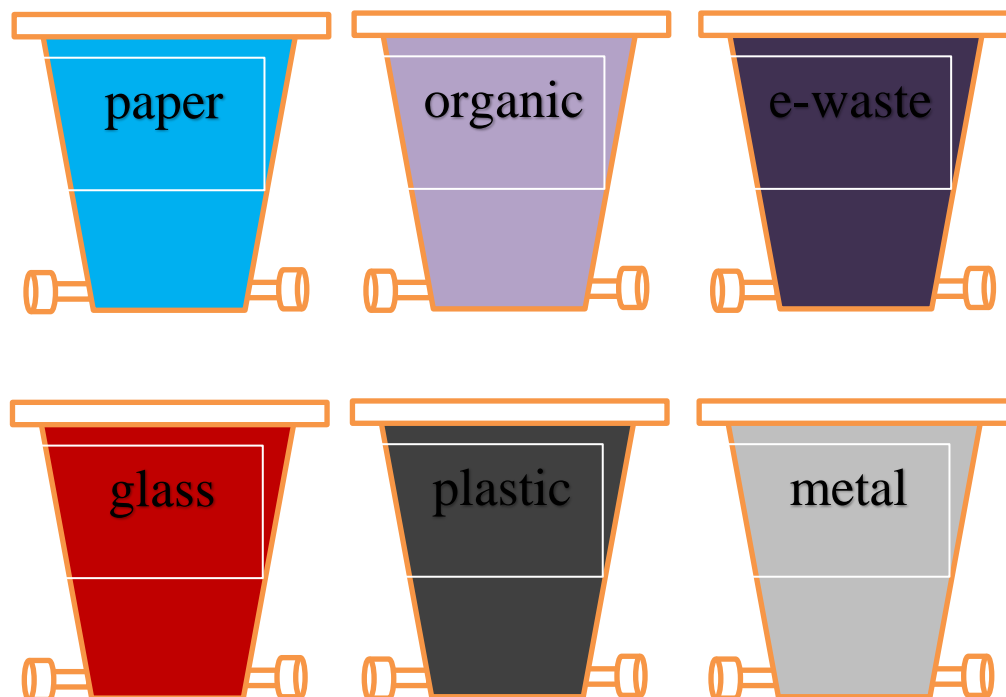
landscape increase daily, hence impacting negatively on the human health and society. Thus, there is a need for urgent intervention of the Ogun State Government to build a sustainable waste collection system for Ota.

## 2. Proposed Solutions

The following approaches are proposed to tackle the problem of indiscriminate waste dumping practice in Ota, Ogun state.

### 2.1. Categorized Waste Collection system

In the categorization of wastes, the characterization method of [34] is proposed. Big metallic waste tanks that are capable of collecting a large amount of categorized refuse is to be painted and put at strategic locations for people to dump litter. The colour of each waste tank is to represent a specific category of waste as related in Figure 3 and Figure 4.



**Figure 3.** Categorized Waste Collection System



**Figure 4.** Categorized Waste Collection System [35]

### 2.2. Determination of daily waste quantity

The quantity of wastes generated daily at different locations in Ota is to be determined at the moment of pickup from the collection system. The amount of waste generated daily will be determined using equation 1.

$$\text{Weight of waste} = \text{Weight of collection system \& wastes} - \text{the weight of the collection system} \quad (1)$$

The quantity of total waste generated in each category will be determined, and the amount of the overall waste generated will also be noted for each collection point.

Determination of the number of wastes generated daily in Ota

The number of wastes generated daily in Ota will be determined using Equation 2

$$\sum (\text{quantity of wastes generated from all locations}) \quad (2)$$

The overall waste generation in Ota would be determined for each category and all identifications.

### 2.3. Wastes pickup from collection bins

The wastes dumped in the different bins would be collected for disposal either to final landfill sites or point of recycling.

### 2.4. Waste Recycling and landfill

To prevent the unpleasant sight of heaped up wastes at the final dumping site, a huge amount of the garbage can be used for landfills in several community roads that have become bad without attention from the government. In contrast, the recyclable wastes such as plastics, metals and others may be recycled.

## 3. Conclusion

Indiscriminate waste dumping has been the usual attitude of many residents in Ota. The government policies would go a long way in correcting this, coupled with a ready waste collection system in place to guide against indiscriminate waste dumping. Lack of sustainable collection system in Ota has fostered the increase of improper waste disposal on major roads, minor roads and in drainages. Hence, a proper waste collection system is needed as a matter of urgency to put a stop to the resulting negative impacts on human health and society. The appropriate actions by Ado-Odo Ota Local Government Area as well as Ogun state Government on these proposed solutions highlighted in this paper would go a long way to make the approaches more effective and functional. Further conclusions arrived at from previous works carried out on waste management in Ota are as follow:

- i. 62% of the population of Ota generate more wastes on weekends than on week days [4].
- ii. The population density of regions in Ota have impact of the quantity of waste generated. The more densely populated areas have higher waste generation [4].
- iii. The wastes generation in Ota can be categorized into biodegradable and non-biodegradable. 38.49% and 61.51% accounts for the two respectively [4].
- iv. Ota residents generate more of inorganic waste than organic waste [2].
- v. About 64% of the wastes generated in Ota is recyclable. This is a good opportunity to convert waste to wealth [2].
- vi. Majority of the residents in Ota engage in waste burning, roadside disposal and flood/canal dumping over appropriate waste dumping approaches [6].
- vii. The wastes generation in Ota has plastics as major wastes component while paper and food wastes follow suit respectively [30].

## 4. Recommendation

This study recommends that the government of Ogun State puts clearer, simple, affordable and systematic waste collection and segregation system and policies into place to help control the indiscriminate wastes dumping attitudes of many residents, so as to eradicate the possible hazards that can arise from it. On the other hand, the resident's responsibilities should include the following:

- i. All households, commercial, industrial and other busy public places must own a proper collection of waste system designated as presented in this study.



- ii. Waste should be segregated into their different categories such as biodegradable and non-biodegradable and other classes by all dwellers so as to aid recycling processes.
- iii. Ogun State Environmental Protection Agency (OGSEPA) should intensify enforcement of sanitation regulations especially concerning waste segregation into designated bins and due penalty for violators.
- iv. All landlords and other property owners should be mandated to well-engineered cleanliness guidelines for their houses and surroundings.
- v. The people of the study region also need to take responsibility to implement the given waste management strategies that is put in place by the authorities by practicing continuous clean-up activities in addition to the usual compulsory end of month environmental sanitation exercises.

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